3. $u_c(t) = Ae^{-\frac{t}{\tau}} + B$

$$\left.\begin{array}{l} At = 0 \;\; u_c(i) = A + B \\ At = \infty \;\; u_c(f) = B \end{array}\right\} \Rightarrow u_c(t) = \left[U_c(i) - u_c(f)\right]e^{-\frac{t}{c}} + U_c(f) \;\; avec \;\; \tau = RC$$

4. a. * Dans l'intervalle $[0, T_1]$ le condensateur se charge :

$$u_c(i) = V_{b_1} = -\frac{R_1}{R_1 + R_2}U_{sat}$$

$$u_c(f) = U_{sat} \qquad et \qquad u_c(T_1) = V_{b_2} = \frac{R_1}{R_1 + R_2}U_{sat}$$

D'où $e^{-\frac{T_1}{\tau}} = \dfrac{u_c(T_1) - u_c(f)}{u_c(i) - u_c(f)} = \dfrac{V_{b_2} - U_{sat}}{V_{b_1} - U_{sat}}$

$$T_1 = RCLn\frac{V_{b_1} - U_{sat}}{V_{b_2} - U_{sat}}$$

* Dans l'intervalle $[T_1, T] = T_2$ le condensateur se décharge

$$u_c(i) = V_{b_2} = \frac{R_1}{R_1 + R_2}U_{sat}$$

$$u_c(f) = -U_{sat} \;\; et \;\; u_c(T_2) = V_{b_1} = -\frac{R_1}{R_1 + R_2}U_{sat}$$

D'où $e^{-\frac{T_2}{c}} = \dfrac{u_c(T_2) - u_c(f)}{u_c(i) - u_c(f)} = \dfrac{V_{b_1} + U_{sat}}{V_{b_2} + U_{sat}}$

$$T_2 = RCLn\frac{V_{b_2} + U_{sat}}{V_{b_1} + U_{sat}}$$

b. $$T = T_1 + T_2 = RCLn\frac{V_{b_1} - U_{sat}}{V_{b_2} - U_{sat}} + RCLn\frac{V_{b_2} + U_{sat}}{V_{b_1} + U_{sat}}$$

$$T = RCLn\left[\frac{(-2R_1 - R_2)(2R_1 + R_2)}{(-R_2)(R_2)}\right]$$

$$T = 2RCLn\frac{2R_1 + R_2}{R_2}$$

Qarray.tn -Aqra Blech- Qarray.tn